

# BULETIN

# Maklumat Pertanian Malaysia

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## KANDUNGAN

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### PUSAT KARTOGRAFI DAN MAKLUMAT PERTANIAN, JABATAN PERTANIAN

Mohamad Noh Samik  
Pengarah  
Pusat Kartografi dan Maklumat Pertanian

### LATAR BELAKANG

Jabatan Pertanian merupakan Jabatan yang utama di negara ini dalam bidang pengembangan. Bagi memastikan perkhidmatan pengembangan dapat berfungsi secara berkesan ia perlu disediakan dan dibekalkan dengan maklumat yang kemaskini dan cepat. Untuk mencapai tujuan ini maka maklumat-maklumat pertanian yang dikehendaki perlu dikumpul, disimpan dan mudah didapatkan apabila diperlukan.

Memandangkan pentingnya maklumat yang kemaskini dalam perkhidmatan pengembangan maka Jabatan Pertanian telah mewujudkan sebuah Pusat yang bertanggungjawab untuk memproses, menyimpan dan mendapat kembali maklumat tentang tanah, tanaman, petani dan pegawai-pegawai yang berkhidmat untuk petani. Pusat yang bertanggungjawab untuk melaksanakan fungsi ini

ialah Pusat Kartografi dan Maklumat Pertanian yang diwujudkan pada 1hb. Januari, 1985.

### FUNGSI DAN ORGANISASI

Pusat Kartografi dan Maklumat Pertanian mempunyai dua fungsi:

- i. mengwujudkan dan mengemaskinikan sistem maklumat berkomputer tentang tanah, tanaman, petani dan pegawai-pegawai yang berkhidmat untuk petani.
- ii. menyediakan dan mengeluarkan peta secara manual dan berkomputer.

Untuk melaksanakan fungsi-fungsi di atas Pusat ini dibahagikan kepada tiga unit seperti ditunjukkan dalam Rajah 1. Pegawai-pegawai Pusat ini adalah terdiri daripada pegawai ikhtisas seperti Pegawai Pertanian, Juruanalisis Sistem dan Pengatur Rancangan Komputer.

Rajah 1: Organisasi



### Aktiviti-Aktiviti

Aktiviti utama Pusat ini ialah memproses, menyimpan dan mendapatkan kembali maklumat-

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MPM ialah sebuah buletin suku tahunan yang diterbitkan oleh Perpustakaan Universiti Pertanian Malaysia. Pandangan dan pendapat penyumbang tidak semestinya mencerminkan pandangan atau pendapat jemaah pengarang. Buletin ini diberi secara percuma atas permintaan. Sila alamatkan semua surat menyurat/pertanyaan kepada: Ketua Pengarang, Buletin Maklumat Pertanian Malaysia, Perpustakaan, Universiti Pertanian Malaysia, Serdang, Selangor.  
 Penasihat: Syed Salim Agha; Ketua Pengarang: Mohd. Ariff Arifin  
 Pengarang-pengarang: Nor Zaidah Mohd. Hashim; Kamsiah Mohd. Ali; Wan Mohd. Ghazalli Wan Mansor  
 Penyunting: Jama'yah Zakaria

maklumat pertanian yang diperlukan oleh perkhidmatan pembangunan. Pusat ini juga bertanggungjawab untuk menyediakan dan mengeluarkan peta-peta sumber (secara manual dan berkomputer) seperti kegunaan tanah, kesesuaian tanah dan peta-peta lain yang diperlukan.

Kedua-dua aktiviti ini dilaksanakan melalui dua projek:

- a) Sistem Meklumat Pertanian
- b) Pemetaan berkomputer

a) Sistem Maklumat Pertanian

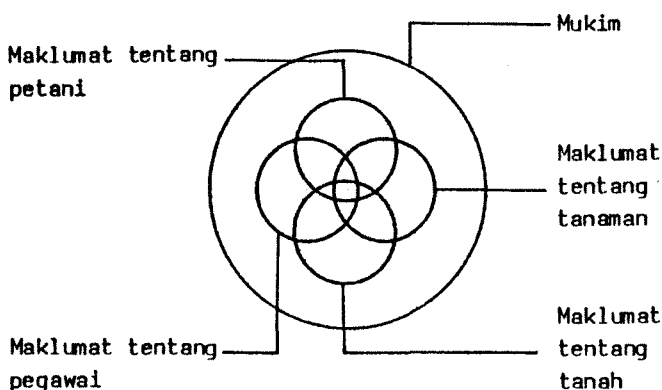
i) Tujuan, Konsep dan Pendekatan

Sistem Maklumat Pertanian (SMP) ialah sistem berkomputer di mana maklumat tentang tanah, tanaman, petani dan pegawai yang berkhidmat untuk petani disimpan dan didapati kembali untuk tujuan perancangan dan pelaksanaan program pembangunan.

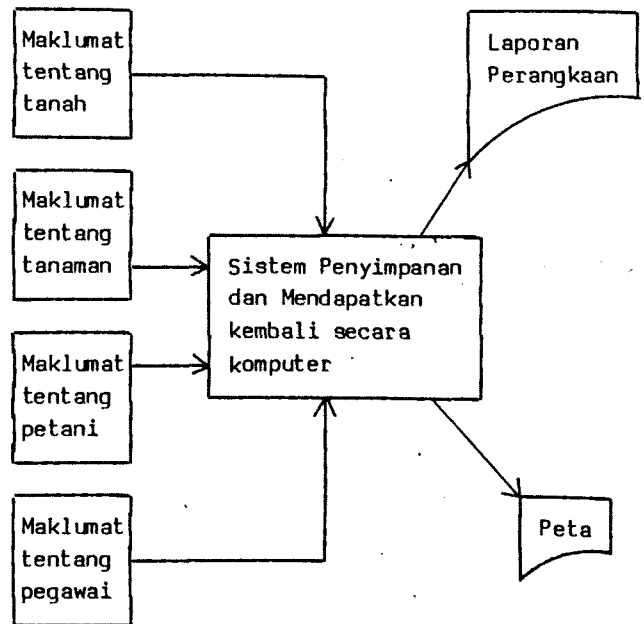
Tujuan SMP ialah menyediakan dan melengkapkan perkhidmatan pembangunan dengan maklumat-maklumat yang kemaskini tentang tanah, tanaman petani dan pegawai-pegawai yang berkhidmat untuk petani.

Dalam SMP semua maklumat tentang tanah, tanaman petani dan pegawai pada satu-satu mukim disimpan dalam komputer. Maklumat-maklumat ini boleh didapati kembali dengan mudah dan cepat dalam bentuk laporan, perangkaan atau peta. Rajah 2 menunjukkan jenis-jenis maklumat dan Rajah 3 menunjukkan konsep SMP.

Rajah 2: Jenis Maklumat dalam Sistem Maklumat Pertanian



Rajah 3: Konsep SMP



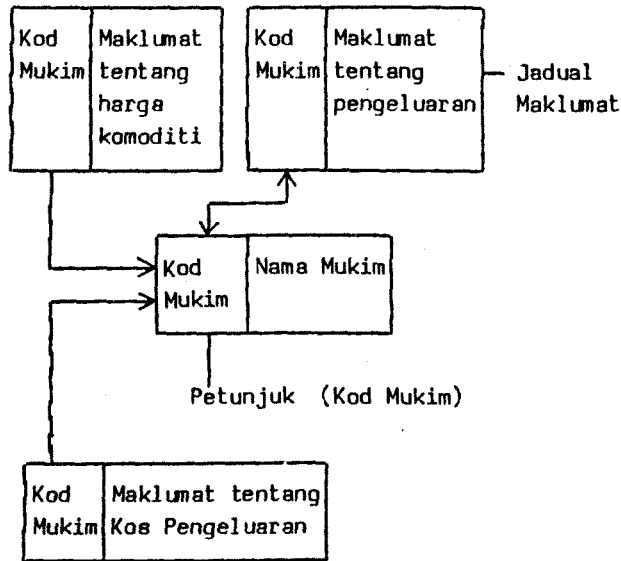
SMP adalah sistem berkomputer yang rumit, ia merangkumi semua maklumat berkaitan dengan pertanian di peringkat mukim. Untuk membolehkan maklumat dalam SMP digunakan bagi tujuan perancangan dan pelaksanaan program pembangunan maka maklumat-maklumat ini perlu dikaitkan di antara satu sama lain. Memandangkan kepada rumitnya sistem yang dibentuk maka SMP memerlukan pendekatan dan cara pengurusan data yang paling berkesan.

Dalam konteks ini pengwujudan SMP telah dibuat dengan menggunakan pendekatan pengkalan data (Database approach). Pengkalan data adalah pendekatan yang termoden dalam rekabentuk dan pengurusan data berkomputer. Dengan menggunakan pendekatan ini maka semua data akan dipusatkan dan timbal tindak data akan dapat dielakan. Selain daripada itu maklumat yang disimpan boleh didapati kembali dengan mudah tanpa menggunakan tenaga perencana program komputer yang banyak.

Satu lagi pendekatan yang digunakan dalam pembentukan SMP adalah pendekatan secara 'building block'. Pendekatan ini membentuk struktur data yang terkecil dalam AIS iaitu jadual maklumat dengan cara tersendiri, tetapi tiap-tiap jadual ini boleh dikaitkan di antara satu sama lain menerusi petunjuk yang sama (common denominator). Contoh jadual maklumat dalam SMP adalah fail komputer yang mengandungi harga komoditi pertanian.

Dua petunjuk digunakan dalam SMP iaitu kod mukim dan kod tempat kerja. Dengan mengetahui salah satu petunjuk ini maka semua jenis maklumat dalam SMP boleh dikaitkan di antara satu sama lain dan didapatkan kembali. Rajah 4 menunjukkan pertalian di antara maklumat dalam SMP melalui petunjuk.

Rajah 4: Pertalian di antara maklumat dalam Sistem Maklumat Pertanian



ii) Struktur Sistem Maklumat Pertanian

Tiap-tiap jenis maklumat dalam SMP disimpan dalam jadual (table). Rajah 5 menunjukkan satu contoh jadual maklumat dalam SMP. Biasanya maklumat akan disimpan dalam beberapa jadual (misalnya kos pengeluaran). Kumpulan jadual-jadual ini dipanggil pengkalan data (database). SMP mempunyai 19 pengkalan data yang mengandungi 107 jadual maklumat yang disusun seperti ini.

Rajah 5: Contoh Jadual Dalam Sistem Maklumat Pertanian

Jadual Harga Komoditi

Kod Mukim	Kod Tanaman	Harga Komoditi	Tahun	Unit
010706	02111011	4.98	79	kg
010201	02111011	5.02	79	kg
010203	02111011	6.40	79	kg
010204	04202111	9.20	79	buah
040602	04202111	10.00	79	Tan

Kod Tanaman	Nama Tanaman	Klon Tanaman
02111011	Padi	IR42
04202111	Durian	D28
04302111	Rambutan	R30
04402001	Mangga	Harumanis
04503002	Nangka	NA7

Kod Mukim	Nama Daerah	Nama Mukim
010104	Muar	Seri Menanti
010606	Muar	Sungai Balang
010201	Johor Bharu	Ulu Tiram
010206	Johor Bharu	Tebrau

iii) Sistem Maklumat Pertanian dan Perkhidmatan Pengembangan yang lebih berkesan

Sistem Maklumat Pertanian akan membolehkan perkhidmatan pengembangan SMP. Pekerja-pekerja pengembangan akan dilengkapi dengan maklumat yang kemaskini tentang tanah, kesesuaian tanaman dan kos pengeluaran. Oleh itu petani-petani akan dapat membuat keputusan yang lebih baik dalam bidang usaha mereka.

Dengan adanya maklumat tentang 350,000 petani dalam SMP, pekerja-pekerja pengembangan akan dapat mengenalpasti dan mengetahui dengan lebih mendalam golongan sasaran mereka. Seterusnya program-program pengembangan akan dapat digubal khas untuk kumpulan-kumpulan tertentu.

Keperluan maklumat yang kemaskini akan menjadi lebih perlu dengan pelaksanaan Dasar Pertanian Negara. Dasar ini memberi tumpuan kepada peningkatan pengurusan golongan sasaran. SMP telah diwujudkan untuk memenuhi kehendak dan tumpuan dalam Dasar Pertanian Negara.

iv) Sistem Maklumat Pertanian sebagai Sistem Maklumat Pengurusan

Sistem Maklumat Pertanian mempunyai potensi yang besar sebagai Sistem

Maklumat Pengurusan bukan sahaja untuk Jabatan Pertanian tetapi juga untuk sektor pertanian keseluruhannya. Pembentukan SMP adalah longgar dan mudah diubah-ubah. Oleh itu ia dapat memenuhi keperluan lain dalam sektor pertanian seperti perikanan, penternakan dan pemasaran.

#### b) Pemetaan Berkomputer

Satu lagi projek yang dilaksanakan oleh Pusat ini ialah penyediaan dan pengeluaran peta berkomputer. Penyimpanan, pengeluaran dan manipulasi peta secara berkomputer akan menyenangkan keperluan maklumat pemetaan untuk tujuan pengurusan sumber.

Pemetaan berkomputer di Jabatan Pertanian telah bermula sejak 1982 apabila perkakasan dan perisian komputer diperolehi. Dengan kemudahan ini berbagai bentuk peta dapat dihasilkan secara berkomputer. Disamping itu usaha manipulasi untuk mendapatkan maklumat daripada peta juga boleh dilaksanakan secara berkomputer.

Sistem pemetaan berkomputer yang ada di Jabatan Pertanian dilengkapi dengan sistem grafik, sistem automasi kartografi dan juga sistem pengurusan analisis data dan juga sistem model. Dengan sistem yang mempunyai maklumat di dalam bentuk lokasi, sama ada bentuk setempat, rangkaian ataupun kawasan maka kedudukan tempat-tempat tersebut dapat ditentukan dengan menggunakan rujukan koordinat.

Proses memasukkan peta ke dalam komputer di panggil 'digitizing'. Setelah maklumat peta ini dimasukkan ke dalam komputer, berbagai pindaan, tambahan dan perubahan dapat dibuat terhadap peta-peta tersebut mengikut kehendak pengguna. Maklumat peta yang terdapat di dalam komputer dapat dikeluarkan sama ada dalam bentuk laporan, berangka ataupun peta mengikut sekil yang dikehendaki oleh pengguna.

#### **PERKHIDMATAN PENGEMBANGAN DALAM TALIAN**

Semua maklumat yang dikumpul dan disimpan dalam SMP bertujuan untuk menjadikan perkhidmatan pembangunan di negara ini lebih berkesan. Dengan

maklumat-maklumat ini Jabatan Pertanian bercadang untuk memulakan perkhidmatan pengembangan dalam talian (on line extension service). Yang dimaksudkan dengan perkhidmatan ini ialah semua orang boleh mendapatkan maklumat tentang pertanian melalui telefon. Maklumat-maklumat yang diminta melalui telefon boleh didapatkan kembali daripada komputer dan dapat diberikan masa itu juga.

Dengan adanya perkhidmatan ini maka maklumat-maklumat tentang pertanian akan dapat disebar dengan lebih cepat dan kemaskini.

#### **PERKAKASAN DAN PERISIAN KOMPUTER**

Untuk membolehkan Jabatan Pertanian memproses, menyimpan dan mendapat kembali berbagai maklumat Pusat ini telah dilengkapi dengan dua buah komputer mini, sebuah komputer adalah dikhaskan untuk kerja-kerja pemetaan dan sebuah lagi untuk kerja-kerja pemrosesan data yang lain serta pengurusan pengkalan data. Kedua-dua komputer ini telah dilengkapi dengan perkakasan-perkakasan lain termasuk perkakasan pemetaan.

Disamping perkakasan komputer, Pusat ini juga telah dilengkapi dengan beberapa perisian (software) yang termoden dan jarang-jarang digunakan dirantau ASEAN. Perisian yang dimaksudkan adalah sistem pengurusan pengkalan data (Database Management System) dan sistem pemetaan berkomputer.

#### **PENUTUP**

Usaha mewujudkan Sistem Maklumat Pertanian dan pemetaan berkomputer oleh Jabatan Pertanian merupakan dimensi yang baru dalam bidang pertanian di negara ini. Dengan adanya sistem ini maka maklumat tentang pertanian yang kemaskini akan dapat disebar dengan lebih cepat untuk kegunaan golongan sasaran bagi meninggikan daya pengeluaran mereka.

Sungguhpun Sistem Maklumat Pertanian adalah satu sistem yang rumit dan menggunakan rekabentuk yang termoden tetapi pengwujudan dan pelaksanaannya dibuat hanya dengan menggunakan kepakaran yang terdapat dalam Jabatan Pertanian sahaja tanpa menggunakan pakar perunding dari luar. Ini merupakan satu pulangan yang besar dalam pembangunan tenaga manusia di Jabatan ini.

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# Teknologi dan Penemuan Baru Pertanian

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## 1. Tumbuhan dirancang untuk membunuh serangga-serangga

Sebuah firma di Belgium, Plant Genetic Systems NV, telah berjaya mengubahsuaikan gen-gen pokok tembakau supaya daun-daunnya mengeluarkan toksin anti-serangga. Gen toksin ini dipencilkan dari *Bacillus thuringiensis* dan diselitkan ke dalam plasmid Ti bakteria yang memang lazimnya menyebabkan tumor di akar pokok-pokok. Dari segi morfologi pokok-pokok yang diubahsuai seiras dengan pokok-pokok tembakau biasa.

Punca: *New Scientist* Bil 1443, 14 Feb. 1985. m.s. 25.

## 2. Suis genetik untuk naikkan mutu protein kacang soya

Nilai pemakanan kacang soya dan legum-legum lain dihadkan oleh kekurangan asid amino metionina. Satu cara untuk mengawal gen yang menetapkan paras metionina telah direka di Plant, Soil and Nutrition Lab., Ithaca, New York. Walaupun pengawitan pokok dengan metionina adalah terlalu mahal, namun pemahaman lebih lengkap mengenai mekanisme fisiologi ini boleh menghasilkan varieti kacang soya yang mengandungi protin bermutu tinggi.

Punca: *Agricultural Research* Jil. 32 bil. 13, Okt. 1984. m.s. 5

## 3. Hormon tumbuhan yang digunakan di akar meransang tumbesaran

Penyelidikan di Penn State University menunjukkan bahawa hormon-hormon tumbuhan iaitu gibberellin dan kinetin jika digunakan di akar tomato boleh meningkatkan kadar fotosintesis dan pertumbuhan. Kepekatan yang digunakan adalah 0.5 ppm bagi gibberellin dan 0.005 ppm bagi kinetin. Sebelum ini hormon-hormon tersebut hanya dapat digunakan di daun sahaja, dan hasilnya pun tidak tetap.

Punca: *Science in Agriculture* Jil. 31 bil. 1, 1984. m.s. 9

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Format AGRIS telah digunakan untuk mengindeks dan penyusunan bibliografi ini dibuat mengikut Pengkelasan AGRIS seperti di bawah ini.

<b>Kod</b>	<b>Perkara</b>
<b>A00</b>	- PERTANIAN (AGRICULTURE)
<b>A50</b>	- Penyelidikan (Research)
<b>B00</b>	- GEOGRAFI DAN SEJARAH (GEOGRAPHY AND HISTORY)
<b>B10</b>	- Geografi (Geography)
<b>B50</b>	- Sejarah (History)
<b>C00</b>	- PENDIDIKAN, PENGEMBANGAN DAN KHIDMAT NASIHAT (EDUCATION, EXTENSION AND ADVISORY WORK)
<b>D00</b>	- PENTADBIRAN DAN PERUNDANGAN (ADMINISTRATION AND LEGISLATION)
<b>D10</b>	- Pentadbiran (Administration)
<b>D50</b>	- Perundangan (Legislation)
<b>E00</b>	- EKONOMI, PEMBANGUNAN DAN SOSIOLOGI DESA (ECONOMICS, DEVELOPMENT AND RURAL SOCIOLOGY)
<b>E10</b>	- Ekonomi (Economics)
<b>E15</b>	- Pengurusan dan Pengelolaan Ladang (Farm Organization and Management)
<b>E30</b>	- Tujuan Pembangunan, Dasar, Program (Development Aims, Policies, Programmes)
<b>E50</b>	- Sosiologi Desa (Rural Sociology)
<b>E70</b>	- Pengedaran dan Pemasaran (Distribution and Marketing)
<b>F00</b>	- PENGELUARAN TUMBUHAN (PLANT PRODUCTION)
<b>F05</b>	- Sains Tumbuhan (Plant Science)
<b>F10</b>	- Kajiucuaca dan Kajiiklim (Meteorology and Climatology)
<b>F20</b>	- Sains Tanah (Soil Science)
<b>F21</b>	- Biologi Tanah (Soil Biology)
<b>F22</b>	- Fizik dan Kimia Tanah (Soil Chemistry and Physics)
<b>F23</b>	- Pengelasan dan Genesis Tanah (soil Classification and Genesis)
<b>F24</b>	- Penyiasatan dan Pemetaan Tanah (soil Surveying and Mapping)
<b>F25</b>	- Kesuburan Tanah; Baja (soil Fertility; Fertilizers)
<b>F26</b>	- Pengurusan dan Sumber Tanah (Soil Resources and Management)
<b>F27</b>	- Penyuburan Tanah dan Sistem Tanaman (Soil Cultivation dan Cropping Systems)
<b>F28</b>	- Memulihguna dan Hakisan Tanah (Soil erosion and Reclamation)
<b>F30</b>	- Pembiakbaikan Tanaman (Plant Breeding)
<b>F40</b>	- Ekologi Tumbuhan (Plant Ecology)
<b>F50</b>	- Struktur Tumbuhan (Plant Structure)
<b>F60</b>	- Biokimia dan Fisiologi Tumbuhan (Plant Physiology and Biochemistry)
<b>F70</b>	- Taksonomi dan Geografi Tumbuhan (Plant Taxonomy and Geography)
<b>H00</b>	- PERLINDUNGAN TUMBUHAN DAN HASIL SIMPANAN (PROTECTION OF PLANTS AND STORED PRODUCTS)
<b>H10</b>	- Perosak Tumbuhan (Pests of Plants)
<b>H20</b>	- Penyakit-Penyakit Tumbuhan (Plant Diseases)
<b>H50</b>	- Pelbagai Penyakit Tumbuhan (Miscellaneous Plant Disorders)
<b>H60</b>	- Rumpai (Weeds)
<b>H70</b>	- Perlindungan Hasil Simpanan Tanaman dan Ternakan (Protection of Stored Products of Plant and Animal Origin)

- K00** - PERHUTANAN (FORESTRY)
- K10** - Pengeluaran Perhutanan (Forestry Production)
- K20** - Pengurusan Perhutanan (Forest Management)
- K50** - Perindustrian dan Teknologi Kayu (Wood Technology and Industries)
- K70** - Kerosakan dan Perlindungan Hutan (Forest Injuries and Protection)
- L00** - PENGELUARAN TERNAKAN (ANIMAL PRODUCTION)
- L05** - Sains Peterernakan (Animal Science)
- L10** - Pembiakbaik Ternakan (Animal Breeding)
- L20** - Ekologi Haiwan (Animal Ecology)
- L30** - Pemakanan Ternakan (Animal Nutrition)
- L32** Memproses Makanan Ternakan (Feed Processing)
- L34** - Mikrobiologi dan Toksikologi Makanan (Feed Microbiology and Toxicology)
- L36** - Kandungan Makanan (Feed Composition)
- L40** - Struktur Haiwan (Animal Structure)
- L50** - Biokimia dan Fisiologi Haiwan (Animal Physiology and Biochemistry)
- L60** - Taksonomi dan Geografi Haiwan (Animal Taxonomy and Geography)
- L70** - Sains Veterinar dan Kesihatan (Veterinary Science and Hygiene)
- L72** - Perosak Haiwan (Pest of Animals)
- L73** - Penyakit-Penyakit Haiwan (animal Diseases)
- L74** - Pelbagai Penyakit Haiwan (Miscellaneous disorders of Animals)
- M00** - SAINS AKUATIK DAN PERIKANAN (AQUATIC SCIENCES AND FISHERIES)
- M10** - Pengeluaran Perikanan (Fisheries Production)
- M20** - Sains Samudra (Oceanography)
- M30** - Limnologi (Limnology)
- M40** - Biologi Akuatik (Aquatic Biology)
- N00** JENTERA DAN BANGUNAN (MACHINERY AND BUILDINGS)
- N10** - Peralatan dan Struktur Kejuruteraan Pertanian (Agricultural Engineering, Structures, and Equipment)
- N20** - Peralatan Ladang (Farm Equipment)
- P00** - SUMBER ALAM (NATURAL RESOURCES)
- P05** - Sumber Tenaga (Energy Resources)
- P10** - Sumber Air dan Pengurusan (Water Resources and Management)
- P12** - Saliran dan Pengairan (Drainage and Irrigation)
- P20** - Sumber Tanah (Land Resources)
- Q00** - SAINS MAKANAN (FOOD SCIENCE)
- Q10** - Memproses Makanan (Food Processing)
- Q20** - Mikrobiologi dan Toksikologi Makanan (Food Microbiology and Toxicology)
- Q30** - Pembungkusan Makanan (Food Packaging)
- Q40** - Makanan Penampung (Food Additives)
- R00** - EKONOMI RUMAHTANGGA, PERINDUSTRIAN DAN KERJATANGAN (HOME ECONOMICS, INDUSTRIES AND CRAFTS)
- S00** - PEMAKANAN MANUSIA (HUMAN NUTRITION)
- S10** - Kandungan Makanan (Food Composition)
- S20** - Fisiologi Pemakanan Manusia (Physiology of Human Nutrition)
- S30** - Makanan (Feeding)
- T00** - PENCEMARAN (POLLUTION)
- U00** - BIDANG ILMU TAMBAHAN (AUXILIARY DISCIPLINES)
- U10** - Matematik dan Statistik (Mathematics and Statistics)
- U20** - Dokumentasi (Documentation)

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# Istilah Pertanian Pilihan

## Bahasa Inggeris

## Bahasa Malaysia

### a

abscission	- keluruhan, luruhan
abscission layer	- lapisan luruhan
absolute humidity	- kelembapan/kelembaban mutlak
absolute temperature	- suhu mutlak
absorb	- serap
absorbance	- keserapan; serapan
absorbent	- perserapan; (bahan serap)
absorber	- (alat serap)/penyerap
absorption	- penyerapan, serapan
acalypha indica	- cika emas/rumput lis
acalypha siamensis	- teh kampung/hutan
active bud	- tunas aktif
adsorb	- jerap
adsorption	- jerapan; penyerapan
afforest	- menghutankan
afforestation	- penghutanan
anacardium occidentale	- gajus
auxins	- auksin
average life	- purata hayat

### b

baking powder	- serbuk kuih
balance, heat	-imbangan haba
base	- asas, tapak; bes; pangkal; pangkalan
basis	- asas; tapak; berbes; pangkal
basicity	- kebesan
basis	- asas
berry	- berri
bias	- (tak saksama)/pincang
biased estimate	- anggaran tak saksama
biased sample	- sampel (tak saksama)/pincang
biased test	- ujian (tak saksama)/pincang
binary compound	- sebatian dedua/biner
binary convertor	- penukar perduaan
binary fission	- belahan dedua/biner
binary number	- nombor perduaan

binary numeral	- angka perduaan
binary scale	- skala dedua/biner
binary system	- sistem perduaan
binding energy	- tenaga penambat
biochemical oxygen demand	- permintaan oksigen biokimia

bioclimate	- bioiklim
bioclimatics	- ilmu bioiklim
biological value	- nilai biologi
bud	- tunas
bud mutation	- mutasi tunas
bud scale	- sisik tunas
bud scale scar	- parut sisik tunas
budding	- penunasan
bunch analysis	- analisa tandan
bunch components	- komponen tandan

### c

calyculate	- berbentuk kelopak
calyculus	- kelopak kecil
calyx	- kelopak (bunga)
calyx tube	- tiub/tabung kelopak
carica papaya	- betik
citrullus lanatus	- tembikai
clove	- bunga cengkih
clove oil	- minyak bunga cengkih
cold rubber	- getah sejuk
collagen	- kolagen
collagen fibre	- serabut/gentian kolagen
colonial animal	- haiwan berkoloni
colour base	- asas warna
colour centre	- pusat warna
colour diagram	- gambarajah warna
colour filter	- turas warna
colour reaction	- tindakbalas warna
colour vision	- nampakkan/penglihatan warna
combination	- penggabungan; gabungan
combination cell	- sel gabungan
combination principle	- prinsip gabungan
combination reaction	- tindakbalas penggabungan
complete flower	- bunga lengkap
conjugation	- konjugatan; pengkonjugatan
conservation	- pengabdian; simpan
conservation of energy	- keabadian tenaga
conserve	- abadi, simpan
cordial	- kordial
crop	- tembolok; tanaman
crop diversification	- pelbagai tanaman
cross	- paling; silang; pangkah kacuk; rentas
cross-bedding	- pelapisan silang

cross fertilization	- persenyawaan kacuk	Earth's crust	- kerak bumi
cross link	- taut silang	earth's magnetic field	- medan magnet bumi
cross multiplication	- pendarapan silang	earth's magnetic pole	- kutub magnet bumi
cross product	- hasil darap silang	ecology	- ekologi
cross ratio	- nisbah silang		
cross-section	- keratan rentas/lintang; irisan lintang	economic geology	- geologi ekonomi
crude	- kasar; mentah	efflorescence	- peroi
crusher	- penghancur	efflorescent	- berperoi
cyathea spp. (Tree fern)	- paku gajah	embryo	- embrio
		evapo-transpiration	- sejat-transpirasi
		evaporate	- sejat
		evaporated	- tersejat; disejat
		evaporation	- penyejatan
		evaporator	- penyejat
		excreta	- kumuh
		excretion	- perkumuhan
		exocycle compound	- sebatian kitar luar
		exodermis	- eksodermis
		expansion	- pengembangan
		experiment	- ujikaji/eksperimen
		experimentation	- pengujikajian/ pengeksperimenan
		expiration	- perlepasan nafas
		extraction	- ekstraksi; pencabulan
<b>d</b>		<b>f</b>	
deep freeze	- sejuk beku lampau	false growth ring	- gelang tumbesar/ pertumbuhan palsu
deep, oceanic	- kawasan dalam lautan	farm improvement	- pemajuan tani
deep-sea	- lautan dalam	fibrosis	- fibrosis
degradation	- pemecahan; perataan	fine grained	- berbutir halus/seni
degree of accuracy	- darjah kejituan	fish farming	- ternakan ikan
dehumidification	- penyahlembaban	fish, marine	- ikan samudra
dehumidifier	- penyahlembab	fissible-bedding	- perlapisan (boleh belah/terbelahkan)
dehydrate	- nyahair/dehidrat	fission	- belahan/pembelahan
dehydration	- penyahairan/ penyahhidratan; pengontangan	fissure	- celah; rekah
depression	- lekukan; lembangan; tundukan; penurunan; penekanan	fixation	- pengikatan; penetapan
desorption	- penyahserapan	fixation of nitrogen	- pengikatan nitrogen
desoxy sugar	- gula desoksi	fluidization	- pembendaliran
disintegration	- penghancuran; penyepaian	foliation	- pendaunan (Bio); foliasi (Geo)
disintegration of matter	- penyepaian jirim	follicle	- folikel
dispersal	- penyerakan; penyebaran	follicle releasing factor	- faktor pembebas folikel
disperse	- serakan; menyerak; sebar; menyebarkan	follicle stimulating hormone	- hormon perangsang folikel
disperse particle	- zarah serakan	fractional crystalli- zation	- penghabluran berperingkat
dispersed	- terserak; tersebar	fractional distillation	- penyulingan berperingkat
double fertilization	- persenyawaan ganda dua	fractional oxidation	- pengoksidaan berperingkat
downy mildew	- kulat jelaga		
drill	- gerudi	fractional precipitation	- pemendakan berperingkat
drill casing	- sarung/salut gerudi		
dry method	- kaedah kering		
dry weight	- berat kering		
drying	- mengeringkan; pengering		
drying agent	- agen pengering		
duct	- saluran		
duct, air	- saluran udara		
ductless gland	- kelenjar tanpa salur		
<b>e</b>			
earth	- bumi; tanah		
earth metal	- logam bumi		
earth movement	- pergerakan bumi		



fractionation - pemecahan;  
pemeringkatan;  
pengecaian  
fresh fruit bunches - buah tandan baru

## g

gas field - medan gas  
gas filter - penuras gas  
ginger - halia  
glycine max - kacang soya  
gradation - perataan  
grade scale - skala gred  
gradient - kecerunan  
growth - tumbesar/pertumbuhan  
growth cycle - kitaran tumbesar/  
pertumbuhan  
growth favric - pabrik tumbesar/  
pertumbuhan  
growth factor - factor pertumbuhan  
growth hormone - hormon tumbesar/  
pertumbuhan  
growth hormone releasing factor - faktor pembebas hormon  
tumbesar/pertumbuhan

## h

habitat - habitat  
headward erosion - hakisan ke hulu  
headwater erosion - hakisan di hulu  
heat energy - tenaga haba  
heat of fusion - haba pelakuran  
heat gradient - kecerunan haba  
heat of hydration - haba penghidratan  
heat, latent - haba pendam  
heat transfer - pemindahan haba  
hill forest - hutan bukit  
hillock - anak bukit  
holozoic - holozoik  
homosporous - homospora  
homospory - homospora  
homozygote - homozigot  
homozygous - homozigot  
honeycomb coral - koral/koral/karang  
sarang lebah  
horizon - ufuk/horizon  
hormone - hormon  
hot spring - mata air panas  
hot water funnel - corong air panas  
humic - humus  
humid - lembab  
humus - humus  
hybridization - penghibridan  
hybridize - menghibrid  
hydrobiology - hidrobiologi

hydrocarbon - hidrokarbon  
hydrologic cycle - kitaran hidrologi  
hydrology - hidrologi  
hydroponics - hidroponik  
hydrosphere - hidrosfera  
hydrostatic pressure - tekanan hidrostatik  
hydrostatics - (ilmu) hidrostatik

## i

igenous rocks - batu-batan igneus  
inorganic rubber - getah bukan organik  
insect - serangga  
insecticide - racun serangga  
insectivore - insektivor  
invertebrate - invertebrata  
isolated propagation - perambatan terpencil  
isothermal adsorption - penyerapan sesuhu/  
isoterma  
isothermal compression - penampatan sesuhu/  
isoterma  
isothermal equilibrium - keseimbangan sesuhu/  
isoterma  
isothermal expansion - kembangan sesuhu/  
isoterma

## j

juice - jus  
junction, stream - persimpangan sungai  
Jurassic period - kala/zaman Jura  
juvenile water - air magma

## l

land form - bentuk bumi  
landscape - rupabumi  
landslide - tanah runtuh  
latex - lateks  
lava blisters - gelembung lava/lahar  
lava cascade - jeram lava/lahar  
lava cave - gua lava/lahar  
lava cone - kon lava/lahar  
lava lake - tasik lava/lahar  
lava pit - lohong lava/lahar  
lava plain - dataran lava/lahar  
lee side - sisi terlindung  
lee ward - arah tiupan angin  
lemon oil - minyak limau  
leucaena glauca - petai jawa, petai  
belanda, petai tiga  
bulan  
life - kehidupan; umur; hayat  
life cycle - edaran kehidupan/hayat  
life element - unsur kehidupan/hayat

life expectancy	-	kejangkaan hayat/ kehidupan	mildew	-	lapuk
lithic	-	litik	mile, nautical	-	batu nautikal
loam	-	lom	milling	-	mengilang, mengisar
long-day plant	-	tumbuhan hari-panjang	molecular weight	-	berat molekul
long period	-	kala panjang	monohybrid	-	monohybrid
longevity	-	kelanjutan umur	moonstone	-	batu bulan
longitude	-	garisbujur/longitud	moor	-	moor
long shore drift	-	hanyutan membujur pantai	moraine	-	morain
loss, energy	-	kehilangan tenaga	moraine terrace	-	undak/teres morain
loss, frequency	-	kehilangan frekuensi	moss	-	lumut
lost river	-	sungai hilang	mucous gland	-	kelenjar mukus
loudness	-	kenyaringan	mud	-	lumpur
louse	-	kutu	mud avalanche	-	runtuhan lumpur
low vacuum	-	vakum rendah	mud crack	-	rekahan lumpur
			mud crack polygon	-	poligon rekahan lumpur
			mud flat	-	dataran lumpur
			mud geyser	-	geiser lumpur
			multiple fruit	-	buah berganda
			multivariate population-	-	penduduk/populasi multi-pengubah/multi- perubah
macroclimate	-	makroiklim	muscle fibre	-	serabut/gentian otot
magnetic field	-	medan magnet	muscle fibrin	-	fibrin otot
magnetic force	-	daya magnet			
magnetic polarization	-	pengkhutuban magnet	n		
magnetization	-	pemagnetan	nephelium lappaceum	-	rambutan
mangifere indica	-	mangga, mempelam	nitric acid	-	asid nitrik
malathion	-	malathion	nitrification	-	nitrikasi
malt	-	malt	nitrous oxide	-	nitrus oksida
mammal	-	mamalia	nodulation	-	pembitilan
mangrove	-	bakau	nodule	-	bintil
mangrove swamp	-	paya/rawang bakau	normal temperature	-	suhu normal
mantle rock	-	batuan mantel	notation	-	tatatanda
maximum temperature	-	suhu maksimum	notch	-	takik
mean	-	min	nutrient	-	zat makanan
mean coefficient	-	koefisien/pekali min	nutrition	-	pemakanan
mean deviation	-	min sisihan			
mean value	-	nilai min	o		
measure of skewness	-	sukatan kepencongangan	oceanic bank	-	guyot
measure space	-	ruang sukatan	oceanic crust	-	kerak lautan
measurement	-	pengukuran/penyukatan	oceanic island	-	pulau lautan
medicinal plant	-	tumbuhan ubat	oceanic rise	-	jendul lautan
membrane	-	membran	oceanic sediments	-	endapan laut
membrane, cell	-	membran sel	offspring	-	zuriat
mensuration	-	penyukatan/mensurasi	oil of cinnamon	-	minyak kayu manis
meristematic tissue	-	tisu meristem	oil of citronella	-	minyak sitronela
metallurgy	-	(kaji logam)/metalurgi	oil of coriander	-	minyak ketumbar
metamorphic rock	-	batuan metamorf	omnivore	-	omnivor
metamorphism	-	metamorfisme	omnivorous	-	omnivor
metamorphosis	-	metamorfosis	on-farm	-	di tanah tani
metathorax	-	metatoraks	onshore wind	-	angin ke darat
metazoa	-	metazoa	open cut mine	-	lombong dedah
method	-	kaedah	open hearth furnace	-	relau tanur terdedah
methyl	-	metil			
micro	-	mikro			
micro balance	-	mikro-neraca/neraca mikro			
milch animal	-	haiwan penyusu			

open hearth process	-	proses tanur terdedah	plant hormone	-	hormon tumbuhan
osmosis	-	osmosis	plant pigment	-	pigmen tumbuhan
outbreeding	-	biakbaka-luar	plasma membrane	-	membran plasma
ovarian follicle	-	folikel ovari	plasma protein	-	protein plasma
ovarian ligment	-	ligamen ovari	plutonic rock	-	batuan pluton
oviduct	-	oviduktus/(salur ovari)	plywood	-	kayu lapis
oxidant	-	pengoksida	pollen	-	debunga
oxidase	-	oksidase	pollen tube	-	tiub debunga
oxidates	-	oksidat	pollinate	-	mendebunga
oxidation	-	pengoksidaan	pollination	-	pendebungaan
oxidation process	-	proses pengoksidaan	pollination, cross	-	pendebungaan kacuk
oxidation reaction	-	tindakbalas pengoksidaan	pollination efficiency	-	kekesanannya pendebungaan
oxide	-	oksida	pollutant	-	bahan pencemaran
<b>P</b>					
parasite	-	parasit	pollution	-	pencemaran
parasite, external	-	parasit luar	polluter	-	pencemar
parasitic capture	-	penangkapan parasit	polymorphism	-	polimorfisme
parasitisation	-	paraparasitan	polytypic species	-	spesies politip
parasitism	-	parasitisme	potassium	-	kalium
parasitology	-	parasitologi	potassium nitrate	-	kalium nitrat
parenchyma	-	parenkima	potassium nitrite	-	kalium nitrit
parent material (soil)	-	bahan induk	precipitant	-	pemendak
pasteurization	-	pempasteuran	precipitation	-	pemendakan
pasteurized milk	-	susu dipasteurkan/ terpasteur	precipitation hardening	-	pengerasan pemendakan
pasteurizer	-	pempasteur	precipitation titration	-	titratan pemendakan
pathogen	-	patogen	predator	-	pemangsa
pathogenesis	-	patogenesis	preglacial	-	praglasier
pebble gravel	-	kelikir kerikil	premature	-	pramatang
pebble phosphate	-	fosfat kerikil	preservation	-	pengawetan
pedestal boulder	-	batu tongkok di atas turus	preservation, food	-	pengawetan makanan
pelmatozoa	-	pelmatozoa	preserve	-	awet
pelvic fin	-	sirip pelvis	pressure	-	tekanan
pelvic girdle	-	bengkung pelvis	pressure, air	-	tekanan udara
perforation	-	penebukan	pressure, applied	-	tekanan dikenakan
pesticide	-	racun haiwan perosak	pressure, atmospheric	-	tekanan atmosfera
petal	-	petal/ranggi	pressure, differential	-	tekanan pembezaan
phosphatase	-	fosfatase	pressure vapour	-	tekanan wap
phosphatase test	-	ujian fosfatase	pressure wave	-	gelombang tekanan
phosphate	-	fosfat	preventive medicine	-	ubat pencegahan
phosphate rock	-	batuan fosfat	prey	-	mangsa
phosphatide	-	fosfatid	pre-predator	-	mangsa-pemangsa
physiological chemistry-	-	kimia fisiologi	processing losses	-	kerugian proses
physiological	-		production potential	-	potensi pengeluaran
contraction	-	pengecutan fisiologi	propagate	-	rambat
physiological saline	-	larutan garam fisiologi	propagated error	-	ralat berambat
phytopathology	-	fitopatologi	propagation	-	perambat; rambatan
phytoplankton	-	fitoplankton	propagation delay	-	kelewatan rambatan
pickle	-	penjeruk; jeruk	propagation of light	-	perambatan cahaya
pithecellobium	-		propagation of waves	-	perambatan gelombang
angulatum	-	petai belalang	propagation, vegetative-	-	perambatan tampang
plant disease	-	penyakit tumbuhan	propagator	-	perambat
			protoplasm	-	protoplasma
			prototype	-	prototip
			protozoa	-	protozoa
			pseudo cross bedding	-	perlapisan pseudo-silang
			pseudo viscosity	-	pseudo-kelikatan

psophocarpus  
 tetragonolobus - kacang botor/kelisa  
 pyrite - pirit  
 quadratic - kuadrat (ik)  
 quantitative reaction - tindakbalas kuantitatif  
 quantity - kuantiti  
 quarry - kuari  
 quartz apparatus - radas kuartza

**r**

rainfall, mean - min curahan hujan  
 rainfall, monthly - curahan hujan bulanan  
 rainfall station - stesen curahan hujan  
 raised wire floor pens - reban dawai jaring  
 random sample - sample rawak/rambang  
 range temperature - julat/banjaran suhu  
 reclamation - penebusgunaan  
 rectilinear - lurus linear  
 rectilinear propagation - perambatan lurus linear  
 regenerate - menjana semula;  
 meregenerasi (Bio)  
 regeneration - regenerasi (Bio);  
 penjanaan semula  
 regeneration area - kawasan regenerasi  
 (Bio); kawasan penjanaan  
 semula  
 regenerative - (boleh) menjana semula;  
 (boleh) menggenerasi  
 semula (Bio)  
 regress - mundur  
 regression, sea - susutan laut  
 regression within group - regresi dalam kumpulan  
 rejuvenate - meremaja  
 rejuvenation - peremajaan  
 relative biological  
 effectiveness - keberkesanan biologi  
 relatif  
 rootnode nematodes - nematod bengkak akar

**s**

sampling - mensampel; pensampelan  
 sand, drift - pasir hembusan/hanyutan  
 sand dune - gumuk pasir  
 sand sheet - kelopak pasir  
 sand spit - tanjung pasir  
 sand stream - sungai pasir  
 saturation - ketepuan  
 saturation current - arus penepuan  
 saturation isomerism - keisometan tepuan  
 saturation point - titik penepuan  
 saturation, zone of - zon penepuan  
 seed - biji benih; biji  
 soil conservation - pengawetan tanah

soil creep - rayapan tanah  
 soil horizon - ufuk tanah  
 soil mechanics - mekanik tanah  
 soil radiation - sinaran suria  
 solar rays - sinar suria  
 solar system - sistem suria  
 solubility product - hasil kelarutan  
 sour cream - tairu  
 soybean oil - minyak kacang soya  
 spathoglottis plicata - orkid lemba  
 specimen - spesimen  
 spice - rempah  
 spinach - bayam  
 sprinkler - perenjis  
 stale - basi  
 stamina - stamina  
 sterile - steril/mandul/sucikuman  
 sterilization - penyucikumanan;  
 penstrilam; pemandulan  
 sterilization radiation - sucikuman cara sinaran;  
 penstrilan cara sinaran;  
 pemandulan cara sinaran  
 sunflower - bunga matahari  
 superposed - bersuperposisi;  
 tersuperposisi;  
 disuperposisi  
 superposed stream - sungai tersuperposisi  
 superposition - superposisi  
 supersaturated - super-tepu/tepu super  
 supersaturated  
 solution - larutan super-tepu/tepu  
 super  
 supersaturation - (penepuan super)/super-  
 penepuan

**t**

tailing - ekoran  
 talings - tahi lombong  
 tapioca - ubi kayu  
 taproot - akar tunjang  
 turf - turf

**u**

undulating membrane - membran berombak  
 undulating plain - dataran bergelombang  
 unstratified - tak berstratum/distratum  
 up lift - pengangkatan  
 upland - tanah tinggi  
 upland, glaciated - tanah tinggi berglasier  
 uprush - ekor ombak  
 upthrust - julangan; sesar julangan  
 upwarp - pemungkuman  
 urinary bladder - pundi air kencing  
 uterine tube - tiub uterus

<b>v</b>					
vaccination	-	pemvaksinan	warm climate	-	iklim panas
vaccine	-	vaksin	warm current	-	arus panas
vacuum distillation	-	penyulingan vakum	warm front	-	perenggan panas
vagrant animal	-	haiwan merantau/siarah	warping	-	menggelending
valley glacier	-	glasier lurah	water, condensation of	-	kondensasi/penumpatan air
valley, hanging	-	lurah gantung	water, fresh	-	air tawar
valley, longitudinal	-	lurah longitud	water, meteoric	-	air meteorik
valley, rift	-	lurah graben	water mill	-	bebaling air
Valley, submerged	-	lurah tenggelam	water softening	-	pelembutan air
valley system	-	sistem lurah	water, stagnant	-	air bertakung
vapour, saturated	-	wap tepu	water supply	-	bekalan air
vapourizer	-	pewap	wave mechanics	-	(ilmu) mekanik gelombang
vascular plant	-	tumbuhan vaskular	wave motion	-	gerakan gelombang
vector	-	vaktor	weather station	-	stesen (kaji) cuaca
vegetable fat	-	lemak sayuran	weed	-	rumpai
vegetable fibrin	-	fibrin sayuran	weed control	-	kawalan rumpai
vegetative	-	tampang	wilt	-	layu
vegetative reproduction-	-	pembiakan tampang	wind gap	-	kancing angin
vibration	-	getaran	wind shadow	-	lindung angin
vinegar essence	-	pati cuka	windward	-	hadap angin
vinegar spirit	-	cuka arak			
vineyard	-	ladang anggur/zabit			
violet	-	lembayung	<b>y</b>		
violet carbomethyl	-	karbometil lembayung	yield	-	keluaran; alah
virgin clay	-	tanah liat segar	yield gold	-	emas kuning
virgin forest	-	hutan dara	yield performance	-	prestasi kadar hasil
virus	-	virus	yield point	-	takat alah
viscosity	-	kelikatan	yield stress	-	tegasan alah
viscous	-	likat			
viscous fluid	-	bendalir likat	<b>z</b>		
volatile	-	meruap	zinc hydrosulphide	-	zinkum/zink hidrosulfida
volatility	-	kemeruapan	zinc oxide	-	zinkum/zink oksida
volatility product	-	hasil kemeruapan	zonation	-	penzonan
volcanic gas	-	gas gunung berapi/ volkano	zone axis	-	paksi zon
volcanic activity	-	kegiatan gunung berapi/ volkano	zone of capillarity	-	zon rerambut
volcanic ash	-	debu gunung berapi/ volkano	zone of eluviation	-	zon pengeluviuman
			zone of equilibrium	-	zon keseimbangan
<b>w</b>			zone leveling	-	zon retakan
warm air mass	-	kumpulan udara panas	zoospore	-	zoospora
			zygote	-	zigot



## Kalendar Kongres Pertanian

Kalendar ini menyenaraikan seminar, konferens, simposium dan bengkel peringkat kebangsaan dan antara-bangsa mengenai pertanian dan perkara-perkara berkaitan dengannya yang akan diadakan dari bulan Jun hingga September 1985. Untuk melengkapkan lagi senarai ini, anda adalah dipelawa untuk melaporkan apa juga maklumat mengenai lain-lain seminar, konferens dan bengkel pertanian yang tidak termasuk di dalam senarai ini.

### Jun 24-25

Judul: Bengkel Penyelidikan Pencemaran Minyak  
Tempat: Fakulti Perikanan dan Sains Samudra, UPM  
Anjuran: Fakulti Perikanan dan Sains Samudra (UPM) dengan kerjasama ESSO.

### Jun 24-Julai 20

Judul: Kursus Pendek Ekonomi Ahli-ahli Sains Samudra dan Akuakultur  
Tempat: Pusat Pengembangan dan Pendidikan Lanjutan (UPM)  
Anjuran: Fakulti Ekonomi Sumber dan Perniagaantani (UPM)

### Julai 1-4

Judul: Kursus Pendek Memproses Makanan  
Tempat: Fakulti Sains dan Teknologi Makanan (UPM)  
Anjuran: Jabatan Teknologi Makanan (UPM)

### Julai 1-12

Judul: Kursus Komunikasi dan Pengembangan Pegawai-Pegawai MADA  
Tempat: MADA, Kedah  
Anjuran: Pusat Pengembangan dan Pendidikan Lanjutan (UPM)

### Julai 1-13

Judul: Penanaman Buah-buahan  
Tempat: MARDI, Serdang  
Anjuran: MARDI

### Julai 12-Ogos 3

Judul: Kursus Penanaman Orkid  
Tempat: MARDI, Serdang  
Anjuran: MARDI

### Julai 15-20

Judul: Penanaman Nenas Metah  
Tempat: MARDI, Jalan Kebun, Kelang  
Anjuran: MARDI

### Julai 22-27

Judul: Rekabentuk dan Pengambilan Data Penyelidikan Padi  
Tempat: MARDI, Bumbung Lima  
Anjuran: MARDI

### Julai 29-Ogos 10

Judul: Penanaman Koko/Kelapa  
Tempat: MARDI, Hilir Perak  
Anjuran: MARDI

### Ogos 2-13

Judul: Kursus Komunikasi dan Pengembangan Pegawai-Pegawai MADA.  
Tempat: MADA, Kedah  
Anjuran: Pusat Pengembangan dan Pendidikan Lanjutan (UPM)

### Ogos 19-27

Judul: Bengkel Pengajaran dan Pembelajaran Dewasa  
Tempat: Pusat Pengembangan dan Pendidikan Lanjutan (UPM)  
Anjuran: Pusat Pengembangan dan Pendidikan Lanjutan (UPM) dan, MARDI

**Ogos 12-17**

Judul: Penanaman Pisang  
Tempat: MARDI, Serdang  
Anjuran: MARDI

**September 2-14**

Judul: Memproses dan Menggred Koko  
Tempat: MARDI, Hilir Perak  
Anjuran: MARDI

**Ogos 24-September 4**

Judul: Kursus Komunikasi dan Pengembangan  
Pegawai-Pegawai MADA  
Anjuran: Pusat Pengembangan dan Pendidikan  
Lanjutan (UPM)

**September 9-17**

Judul: Kursus Antarabangsa Perlindungan  
Tumbuhan dalam Koko  
Tempat: Universiti Pertanian Malaysia  
Anjuran: Jabatan Perlindungan Tumbuhan,  
UPM

**September 2-4**

Judul: Kursus 'Perhutanan Tani'  
(Agroforestry)  
Tempat: Fakulti Perhutanan, UPM  
Anjuran: Fakulti Perhutanan, UPM

**September 30-Oktober 9**

Judul: Penanaman Sayur-sayuran  
Tempat: MARDI, Jalan Kebun  
Anjuran: MARDI

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**PERTUKARAN ALAMAT**

Jika anda telah bertukar alamat, harap beritahu kami  
butir-butir berikut:-

- (i) alamat baru
- (ii) alamat lama
- (iii) nombor senarai mel

ALAMATALAMATALAMATALAMATALAMATALAMATALAMATALAMATALAMATALAMA

## Bibliografi-Bibliografi Terbitan Perpustakaan Universiti Pertanian Malaysia

Perpustakaan UPM telah menerbitkan beberapa buah bibliografi yang merupakan sumber rujukan yang amat berguna. Bibliografi-bibliografi tersebut adalah seperti berikut:-

<u>Judul</u>	<u>Harga</u>
1. Abstrak Alam Sekitar Malaysia. (Malaysian Environment Abstracts). 1981	\$ 5.00
2. Abstrak Buah-buahan Malaysia. (Malaysian Fruit Abstracts) Nov. 1980	\$10.00
3. Abstrak Penukaran Biojisim Kepada Bahan Tenaga. (Abstracts on Bioconversion for Fuel production). Okt. 1981	\$10.00
4. Asas Ekologi untuk Kegunaan Rasional Sumber Hutan di Asia Tenggara. (Ecological Basis for Rational Utilization of Forest Resources in Southeast Asia: A bibliography).1982	\$ 5.00
5. Bibliografi Alam Sekitar ASEAN. (ASEAN Environment Bibliography).1981	\$ 5.00
6. Bibliografi Bioteknologi (Bibliography on Biotechnology) Mac 1984	\$ 5.00
7. Bibliografi Kejuruteraan ke arah Pertanian Progresif (Engineering towards progressive agriculture: a bibliography). Sept. 1983	\$ 5.00
8. Bibliografi Pendidikan Jasmani dan Sukan dalam Pembangunan Negara. (A Bibliography on Physical Education and Sport in Nation Building). Ogos 1982	\$ 5.00
9. Bibliografi Penyakit Merah (Bibliography on Penyakit Merah). Okt. 1983	\$ 5.00
10. Bibliografi Penyelidikan dalam Pendidikan: Penyelia sebagai pemimpin kumpulan (Bibliography on supervision in Education: the supervisor as team leader). Ogos, 1983	\$10.00
11. Bibliografi Perhutanan Malaysia. (Bibliography of Malaysian Forestry). Nov. 1980	\$ 5.00
12. Bibliografi Perniagaantani. (Bibliography of Agribusiness). Ogos 1976	\$ 1.00
13. Bibliografi Pertanian Malaysia 1979-1981	\$20.00
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